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UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION

AYLUS NETWORKS, INC.,  
Plaintiff,  
v.  
APPLE INC.,  
Defendant.

CASE NO. 3:13-cv-04700-EMC  
**DECLARATION OF DR. NATHANIEL  
POLISH, PH.D. IN SUPPORT OF  
DEFENDANT APPLE INC.'S  
RESPONSIVE CLAIM CONSTRUCTION  
BRIEF**

Date: Nov. 10, 2014  
Time: 2:30 p.m.  
Place: Courtroom 5, 17th Floor  
Judge: Honorable Edward M. Chen

1 I, Nathaniel Polish, declare as follows:

2           **I. Introduction**

3           1. I have been asked by counsel for defendant Apple Inc. (“Apple”) to provide my  
4 opinions concerning the meaning of certain claim terms of U.S. Patent No. RE44,412 (the “‘412  
5 patent”). Specifically, I have been asked to provide my opinions on how skilled persons in the art  
6 would have understood certain terms at the time of the alleged invention of the ’412 patent.

7           2. I am being compensated at my customary rate of \$500 per hour for the time I  
8 spend on this matter. My compensation is not dependent on the opinions I render or the outcome  
9 of the litigation.

10           **II. Qualifications**

11           3. My *curriculum vitae*, which includes a detailed record of my professional  
12 qualifications, including a list of publications, awards, professional activities, and recent  
13 testimony either at trial or at deposition, is attached as **Exhibit 19**. Relevant highlights are  
14 summarized below.

15           4. I have a Ph.D. in Computer Science from Columbia University. I hold the  
16 following four degrees from Columbia, spanning the years 1980 to 1993:

- 17           • Ph.D. in Computer Science, May 1993, Thesis: Mixed Distance Measures for the  
18 Optimization of Concatenative Vocabularies in Speech Synthesis;
- 19           • M.Phil. in Computer Science, December 1989;
- 20           • M.S. in Computer Science, December 1987;
- 21           • B.A. in Physics, Columbia College, May 1984.

22           5. For over twenty-five years, I have run a computer technology development firm  
23 that I co-founded, called Daedalus Technology Group. My primary business activity is the  
24 development of computer-related products. This activity involves understanding the business  
25 objectives of customers, designing products to suit their needs, and supervising the building,  
26 testing, and deployment of these products. I develop hardware and software as well as supervise  
27 others who do so.

1       6.     Also, from time to time I found other companies in order to pursue particular  
 2 product opportunities. I develop and ultimately sell these companies. Most of my business  
 3 activity, however, is as a consulting product developer. From time to time I have also served as  
 4 an expert witness on computer and software related cases. I am a named inventor on seven United  
 5 States patents, and am a member of several professional societies, including the IEEE and ACM.

6       7.     I have extensive experience in several areas related to this case. I have developed  
 7 a number of multimedia streaming systems. These include a system that I built for Instant Video  
 8 Technology in the mid-1990s through the early 2000s called burstware. This system delivered  
 9 video streams over the Internet to video client computers. I also built a system for a company  
 10 called Savos that streamed audio content to customers' cell phones. Both of these systems were  
 11 deployed to many clients over the Internet. I also have many years of experience in telephony. I  
 12 developed one of the first interactive voice response systems (IVR) in the mid-1980s for Dun &  
 13 Bradstreet. Over the years I have built many other systems using various aspects of telephony  
 14 including text messaging and audio conferencing.

15      8.     Based on my work with Instant Video Technology and other projects, I have  
 16 personal knowledge of the state of the art in multimedia streaming in the mid-2000s. I have an  
 17 understanding of what a person of ordinary skill in the art in the mid-2000s was and how that  
 18 person would understand the terminology used in the '412 patent. In this regard, based upon my  
 19 knowledge and experience and my review of the '412 patent, it is my opinion that a person of  
 20 ordinary skill in the art at the time of the '412 patent would have had a bachelor's degree in  
 21 computer science plus at least two years of experience in software engineering, or the equivalent.

22      **III. Materials Reviewed**

23      9.     To prepare this declaration, I reviewed the '412 patent, which I understand is  
 24 attached to the Declaration of Robert Buergi in Support of Apple's Responsive Claim  
 25 Construction Brief ("Buergi Decl.") as Exhibit 1, as well as the prosecution history for the '412  
 26 patent and the patent from which the '412 patent reissued, U.S. Patent No. 7,724,753, including  
 27 certain references cited therein, and relevant dictionaries, technical specifications and  
 28

1 publications. I have also brought to bear my personal experience and specific knowledge of the  
 2 underlying technologies as well as my industry experience generally.

3 **IV. Overview of the '412 Patent**

4 10. The '412 patent, entitled “Digital Home Networks Having a Control Point Located  
 5 on a Wide Area Network,” was filed on September 14, 2011 and issued on August 6, 2013. The  
 6 '412 patent is a reissue of U.S. Patent No. 7,724,753 (the “‘753 patent”), which was filed on  
 7 March 8, 2006 and issued on March 25, 2010. The '753 patent is a continuation in part of two  
 8 other applications, applications Nos. 11/166,407 and 11/282,924, filed Jun. 24, 2005 and Nov. 18,  
 9 2005, respectively. The '412 patent generally relates to a system and method for delivering  
 10 multimedia content from a media server on a wide area network to a media renderer located in a  
 11 home network, so that a user can connect to content provided by a media server located outside  
 12 the home. Buergi Decl., Ex. 1 at Abstract, 5:35-48.

13 11. The patent describes the alleged invention in the context of two industry standards,  
 14 the IP Multimedia Subsystem standard (“IMS”) and Universal Plug and Play standard (“UPnP”).  
 15 *See, e.g.* Buergi Decl., Ex. 1 at Abstract, 1:35-37, 5:49-6:3, Fig. 1 (relating to IMS); *id.* at 10:41-  
 16 44, 16:37-49, 17:7-8, 17:60-63, Fig. 11 (relating to UPnP).

17 12. IMS is defined by various specifications published by several standards bodies,  
 18 including 3GPP. *See* 3GPP TS 23.228 version 6.15.0 Release 6, IP Multimedia Subsystem (IMS)  
 19 Stage 2 specification (“3GPP IMS specification”) at 1. Attached as **Exhibit 20** is a true and  
 20 correct copy of excerpts from the 3GPP IMS specification.

21 13. As the acronym suggests, IMS (or IP Multimedia Subsystem) is an architecture for  
 22 multimedia delivery over the internet using the internet protocol, IP. *See, e.g.*, Gilles Bertrand,  
 23 “The IP Multimedia Subsystem in Next Generation Networks” (May 30, 2007) (“Bertrand”) at 1,  
 24 a true and correct copy of which is attached as **Exhibit 21**. The primary goal of IMS was to allow  
 25 one to merge the internet and cellular worlds, so that users of cellular networks could access  
 26 multimedia services available on the Internet. *Id.*

27 14. The IMS architecture can be divided into three layers:

- 1       • An Application layer, which consists of Application Servers (AS) for hosting IMS  
2        services, such as delivery of a multimedia stream.
- 3       • A Control layer, which is made up of various components, including one or more  
4        Call Session Control Function (CSCF) components, which are responsible for  
5        managing interactions with a user.
- 6       • A Transport layer, consisting of one or more User Equipment (UE) devices (*e.g.* a  
7        user's cellular phone), which a user uses to access IMS services.

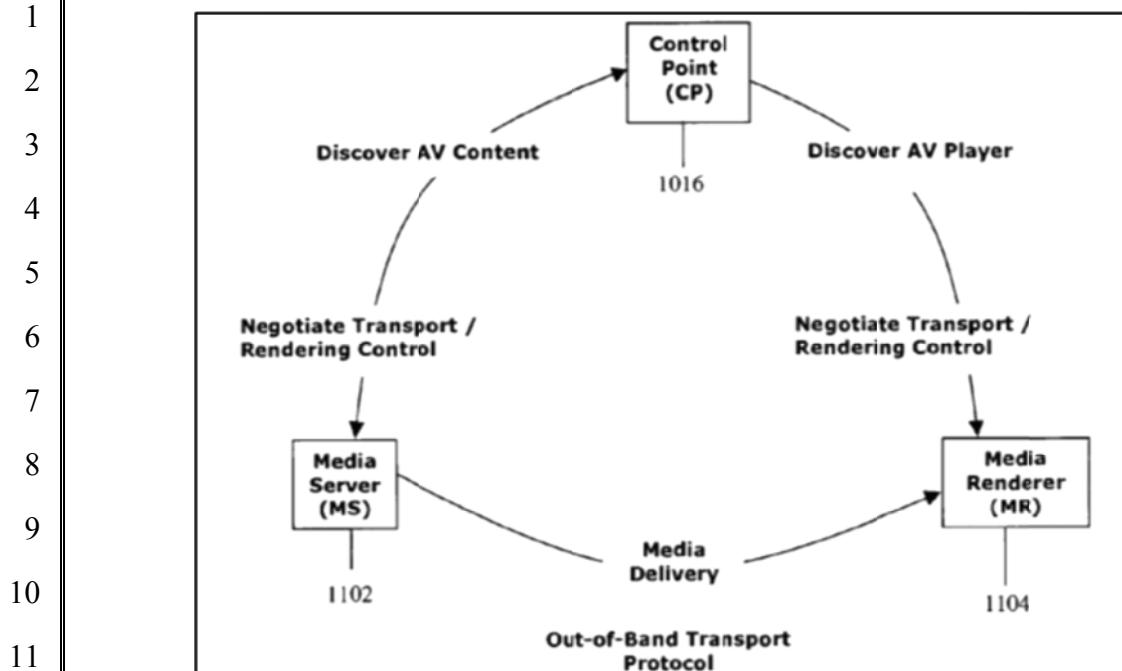
8       *See Ex. 21 (Bertrand) at 2-4.*

9       15. By separating control and application services into different layers, IMS separates  
10      control functionality from multimedia delivery functionality. *Id.* at 2.

11       16. UPnP is defined by various specifications published by the UPnP Forum,  
12      including an architecture for distributing digital audio and video called the "UPnP AV  
13      Architecture." UPnP AV Architecture 0.83 for Universal Plug and Play Version 1.0 Preliminary  
14      Design, June 12, 2002 ("UPnP AV Architecture specification") at 3. I understand that a copy of  
15      the UPnP AV Architecture specification is attached as Exhibit 13 to the Declaration of Sho Kou  
16      In Support of Apple's Responsive Claim Construction Brief ("Kou Decl.").

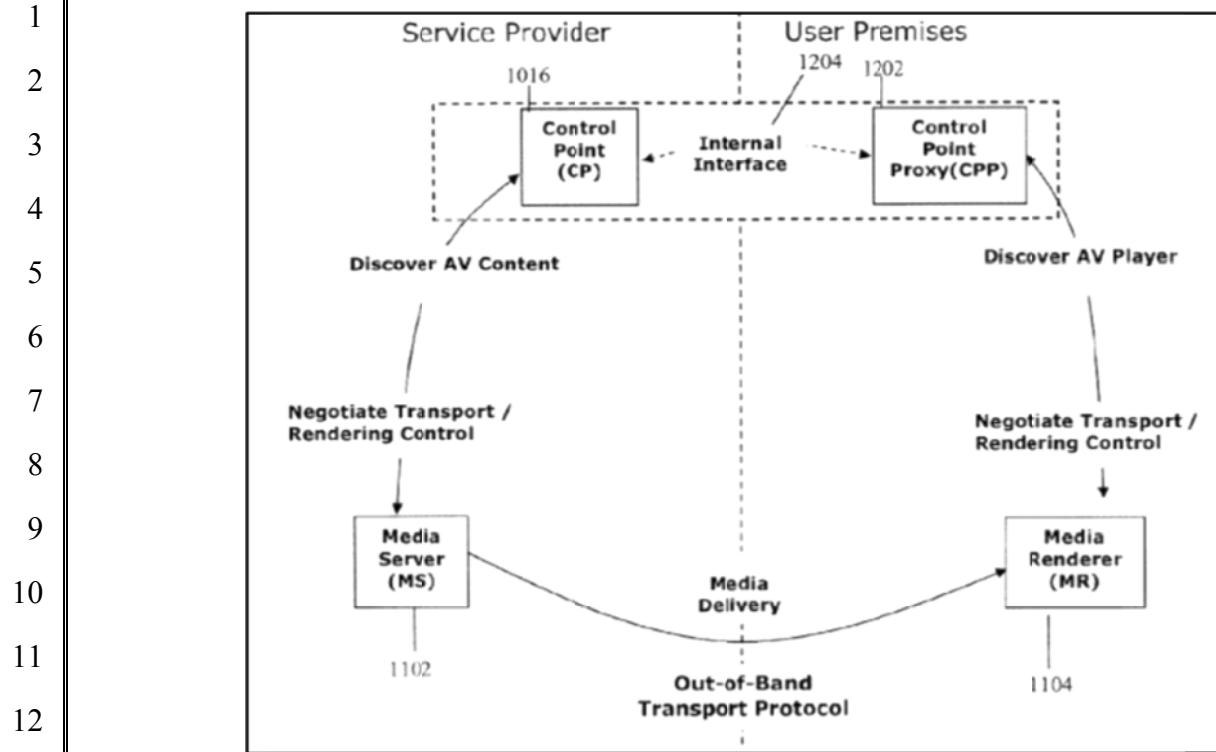
17       17. The basic UPnP AV architecture includes three interacting devices: a Control  
18      Point, a MediaServer, and a MediaRenderer, as shown below.

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18. The MediaServer stores content and the MediaRenderer renders media content.  
 19. The Control Point manages the operation of the MediaServer and MediaRenderer. Specifically,  
 20. the Control Point obtains from each of the MediaServer and MediaRenderer a list of its supported  
 21. transfer protocols and data formats, selects a matching pair of transfer protocols and data formats,  
 22. and (in the typical case) informs the MediaServer and MediaRenderer that an outgoing/incoming  
 23. connection is about to be made using the selected transfer protocol and data format. Kou Decl.,  
 24. Ex. 13 (UPnP AV Architecture specification) at 9 (steps 3-5).

25. 19. The '412 patent describes an extension of the UPnP AV architecture, which is  
 26. shown in Figure 12:  
 27.  
 28.



20. The '412 patent describes a "wide area networking extension of UPnP" in which the Control Point is moved onto an element of the wide area network, such as the serving node of an IMS session, and a Control Point Proxy (or CPP) is introduced in the User Equipment. Buergi Decl., Ex. 1 at 17:60-63, 17:7-40. The CPP cooperates with the Control Point to negotiate delivery of media content between the Media Server and the Media Renderer. *Id.* at 24:46-51, 25:58-62, 26:47-52. Moving the control point into the wide area network enables a user to connect to content provided by an MS located outside of the home. *Id.* at 5:37-46, 17:12-32, 61-63. The architecture also purportedly minimizes use of the "expensive" cellular network because the Control Point may communicate with the Media Server over a wide area (wired) network and the CPP may communicate with the Media Renderer using a personal area network, such as Wi-Fi. *Id.* at 17:4-19, 17:45-47, 17:60-64.

## V. Claim Constructions

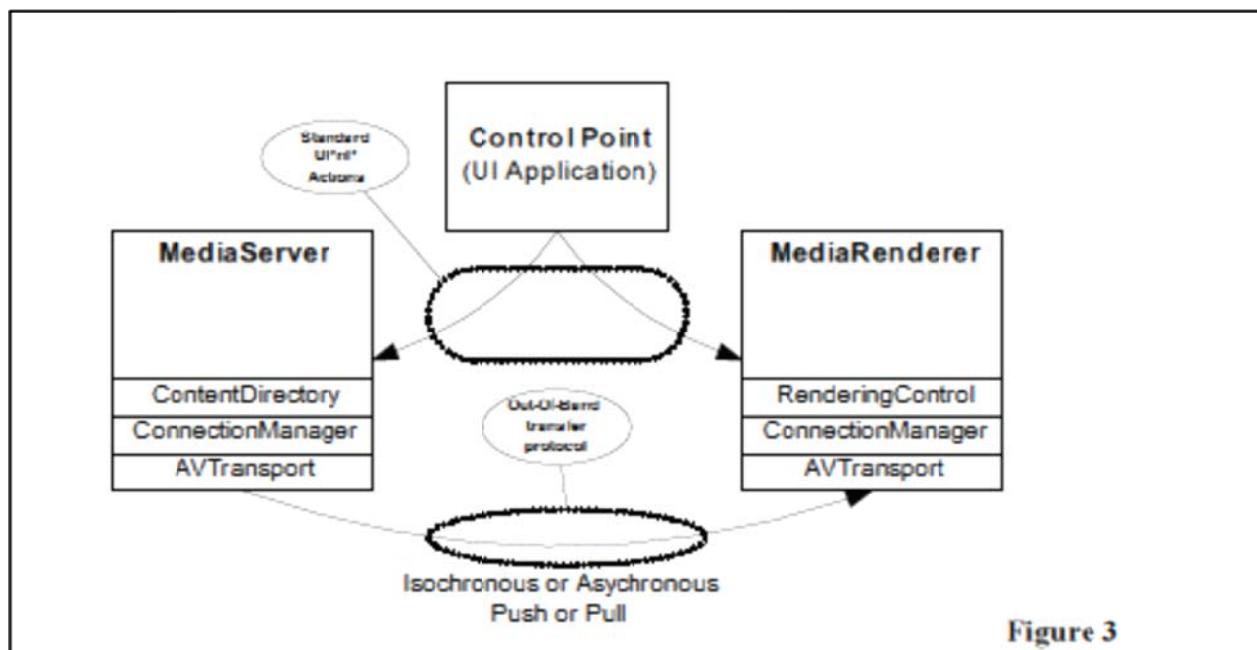
21. It has been explained to me that claim terms are generally interpreted in accordance with the customary meaning they would have to a person of ordinary skill in the art at the time of the invention. It has also been explained to me that the person of ordinary skill in the

art would read the claim term in the context of the claims as well as the entire patent, including the patent specification and figures. I understand that is also appropriate to look to the record of a patentee's communications with the patent office during prosecution to obtain the patent ("the prosecution history") to understand the claim terms. Finally, it has been explained to me that one can also consult other public sources (such as dictionaries or prior art) that shed light on the proper meaning of a particular claim term.

#### A. "serving node"

22. In my opinion, the term "serving node" in the context of the '412 patent means "a node configured to establish an IMS session with the UE."

23. The term "serving node" is not a term of art, and does not have a commonly understood meaning to those of skill in the art. As discussed above, the '412 patent describes the alleged invention in the context of two industry standards, UPnP and IMS. Many of the terms used in the patent specification are terms of art defined in these industry standards. For instance, the terms "Media Server," "Media Renderer" and "Control Point" are all terms of art used in the UPnP standard, as illustrated in the following diagram from the UPnP AV Architecture specification:



**Figure 3**

27 Kou Decl., Ex. 13, (UPnP AV Architecture specification) at 5. Similarly, many of the terms used  
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1 throughout the '412 patent, such as Call State Control Function (CSCF), Application Server (AS)  
 2 and User Endpoint (UE) are terms of art used in the IMS standard, as illustrated in the following  
 3 diagram:

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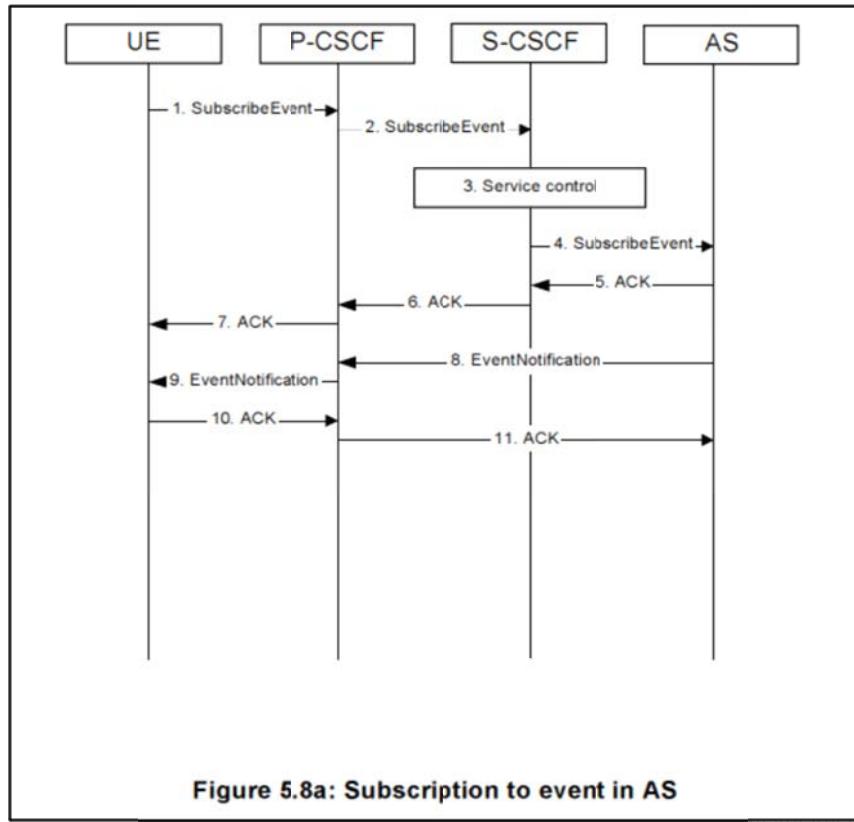
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18 Ex. 20, (3GPP IMS specification) at 61; *see also* Ex. 21 (Bertrand) at 2-3. In contrast, the term  
 19 “serving node” is not a term of art used in either the UPnP or IMS standard, and does not have a  
 20 commonly understood meaning to those of skill in the art.

21       24. When viewed in the context of the patent specification, one skilled in the art would  
 22 understand the term “serving node” to refer to a network node that can establish an IMS session  
 23 with the user endpoint for at least the following reasons.

24       25. The patent explains that the invention relates to delivering multimedia content  
 25 using IMS networks. For instance, the specification states:

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- “The invention generally relates to IP Multimedia Subsystem (IMS) networks and, more specifically, to IMS users that use (perhaps multiple) discovered user endpoint devices.” Buergi Decl., Ex. 1 at 1:35-37.

1       • “In general, in one aspect, the invention features a method of controlling and  
 2       delivering media content from a media server (MS) to a media renderer (MR)  
 3       utilizing a wide area IMS network for control.” Buergi Decl., Ex. 1 at 5:49-52.

4       26. In this context, the specification consistently uses the term “serving node” to refer  
 5       to elements that can generate an IMS session with the UE. For example, the specification states:

6       • “In one scenario, a subscriber wanting to view multimedia content from an Internet  
 7       server on his handset initiates an IMS request to serving node 408. This request  
 8       then causes a connection to be made to the serving node 408... and an IMS session  
 9       is established between serving node 408 and the UE ....” Buergi Decl., Ex. 1 at  
 10      12:11-22.

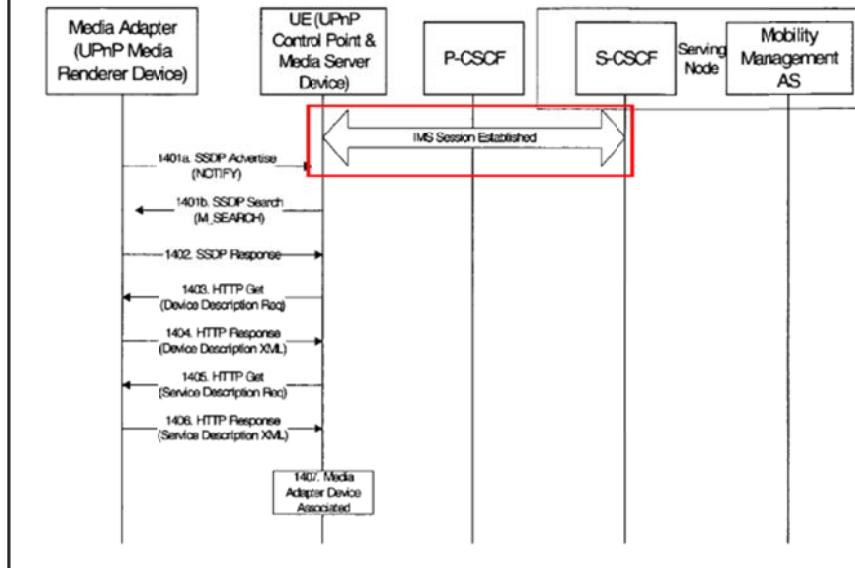
11      • “The following case illustrates a session that involves the PA client discovering an  
 12      associated device via UPnP Discovery mechanisms, and the serving node  
 13      triggering a handoff procedure from the PA client to the associated device to  
 14      initiate a real time streaming protocol (RTSP) streaming session. In this example,  
 15      an IMS/SIP session has been established between the PA and the Media Server  
 16      Control AS in the serving node.” Buergi Decl., Ex. 1 at 21:48-55.

17      • “In this example, the PA acts as a SIP UE and an IMS/SIP session has been  
 18      established between the PA and the Media Server Control AS in the serving node.”  
 19      Buergi Decl., Ex. 1 at 22:60-62.

20      • “It is assumed that the PA is acting as a SIP UE and that an IMS/SIP session has  
 21      been established between the PA and the Media Server Control AS in the serving  
 22      node.” Buergi Decl., Ex. 1 at 23:52-54.

23       27. Similarly, the figures consistently depict the “serving node” as a node configured  
 24       to establish an IMS session. For instance, the first step in the process illustrated in Figure 14 of  
 25       the ’412 patent (reproduced below) is to establish an IMS session.

Figure 14



Similarly, the first step depicted in Figures 15 and 16 is to establish an IMS session with the UE. Buergi Decl., Ex. 1 at Figs. 15-16.

28. Finally, in the context of each of the independent claims of the '412 patent, the claimed serving node is provisioned with control point (CP logic). Buerghi Decl., Ex. 1 at claims 1, 20, 27. The specification consistently describes the CP logic as operating in the context of an IMS session. For example, the specification states:

- “The control point (CP) 1016, referred to earlier, is the mechanism used to allow ‘out of band’ media transport under control of IMS.” Buergi Decl., Ex. 1 at 15:55-57.
- “Now consider a UE requesting Mobile TV service. This request emanates from the UE (on an ICL) and is forwarded by the S-CSCF to the CP 1016 acting as an AS (in standard IMS fashion).” Buergi Decl., Ex. 1 at 16:1-4.
- “Thus, in a wide area networking extension of UPnP, moving the CP into a network element, such as the serving node of an IMS session, and placing the CPP into the handset optimizes usage of the wireless spectrum usage.” Buergi Decl., Ex. 1 at 17:60-63

29. Nowhere does the specification contemplate a serving node without the capability of establishing an IMS session. 10

1       30. Thus, in my opinion, one skilled in the art would understand that the claimed  
 2 “serving node” is a node configured to establish an IMS session with the user endpoint.

3       **B. “handset”**

4       31. In my opinion, the term “handset” in the context of the ’412 patent means “a  
 5 mobile phone capable of making and receiving calls over the Public Switched Telephone  
 6 Network.”

7       32. Unlike the term “serving node,” the term “handset” does have a well-understood  
 8 plain meaning to one skilled in the art. One skilled in the art in the mid-2000s would have  
 9 understood that a “handset” is a handheld device that can make and receive telephone calls. The  
 10 term “handset” suggests to one of ordinary skill in the art (as well as lay persons) a device with a  
 11 particular size and weight, such that the device can comfortably fit in a user’s hand. In other  
 12 words, a handset is something that is meant to be held in one’s hand. And, the term handset has  
 13 been associated with telephony for decades. Thus, one skilled in the art would understand that a  
 14 handset is a handheld device capable making and receiving telephone calls.

15      33. The ’412 patent specification uses the term “handset” consistent with this plain  
 16 meaning. For example, the specification states:

- 17       • “As the bandwidth provided by wireless networks increases, it is now possible to  
 18 send and receive multimedia information to handsets. Thus, handsets are no  
longer used only to make and receive telephone calls.” Buergi Decl., Ex. 1 at  
 19 4:60-63.
- 20       • “The following scenarios for Class A and B handsets are possible:  
 21       1. Two subscribers A and B are in a voice call....  
 22       2. Two subscribers A and B are in a voice call...  
 23       3. Two subscribers A and B are in a voice call...  
 24       4. Two subscribers A and B are in a circuit-switched voice call....” Buergi Decl.,  
 25       Ex. 1 at 15:4-45.

26      34. The specification further explains that:

- 27       • “Typically, mobile handsets are connected to a Base Transceiver Station (BTS)  
 28 using a Radio Access Network (RAN) that uses a modulation scheme such as  
 CDMA (Code Division Multiple Access) or GSM (Global System for Mobile  
 communications). The BTSs are connected via fixed links to one or more Base  
 Station Controllers (BSCs), and the BSCs are aggregated into switches called  
 Mobile Switching Centers (MSCs). The MSC is connected to the Public Land

Mobile Network/Public Switched Telephone Network (PLMN/PSTN), typically through a gateway switch called the Gateway Mobile Switching Center (GMSC).” Buergi Decl., Ex. 1 at 1:41-51.

35. Here, the specification specifically describes typical handsets as mobile devices that are capable of making and receiving telephone calls (as opposed to any other type of voice calls), consistent with the plain and ordinary meaning of the term. In particular, the specification makes references to the Public Telephone Switched Network, which one skilled in the art would understand refers to the network infrastructure for making and receiving telephone calls.

36. Thus, consistent with the plain meaning of the term and its use in the patent specification, it is my opinion that the term “handset” in the context of the ’412 patent means “a mobile phone capable of making and receiving calls over the Public Switched Telephone Network.”

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge. This declaration is executed on September 25, 2014, at New York, New York.

*Mark Polk*

Nathaniel Polish, Ph.D.